Goal and Background on Hydrologic and Water System Information

The goal of the Water Resources Technical Advisory Committee (WRTAC) is to help Tennessee's water systems become more sustainable, affordable, and reliable, primarily through regional planning and by implementing plans with regional partners. One of the challenges in regional planning is collecting the baseline hydrologic and water system information necessary to develop the plan. The WRTAC conducted an assessment of the routinely collected hydrologic and water system information and the significant gaps in statewide water resource information. The team used the assessment results to develop a proposal for a statewide system for reporting, maintenance and access to basic hydrologic and water system information.

Collected Hydrologic / Water System Data

There are a number of state and federal agencies and other organizations that routinely collect water resources data and information that could benefit systems pursuing regional planning.

- Tennessee Department of Environment and Conservation
    - Monthly Operating Report – Hard copy report submitted monthly by water utilities focused on the quality of the raw versus finished water.
    - Inter-basin Water Transfer Report – Hard copy report submitted annually by anyone permitted to transfer water out of a major river basin for the benefit of (or to supply) a public water system. Permitted inter-basin transfers are posted on the TDEC website.

- US Geological Survey
    - Surface water data -Current and historical gage data from approximately 120 surface water points across the state accessible electronically from the USGS website.
    - Groundwater data – Well data from approximately 20 points, primarily in West Tennessee, accessible electronically from the USGS website.
    - Water system data – Hard copy survey of water systems every five years focused on water use.
    - Low flow analysis – Basis for the 7Q10 which is conducted approximately every ten years.

- Tennessee Department of Agriculture
    - *Farm and Ranch Irrigation Survey* – National USDA report last published in 2008.

- Tennessee Valley Authority
    - *Assessment of Water Use in the Tennessee Valley* – Report produced every five years presenting water use estimates for the Tennessee River watershed and identifying critical water supply areas and issues expected to affect the Tennessee River watershed over the next 30 years.

- Tennessee Utility Management Review Board and Water and Wastewater Financing Board (Tennessee Comptroller of the Treasury)
    - AWWA Water Audit (Excel-based software mandated beginning in January 2013) and reporting worksheet submitted annually with audited financial statements. Audit Compiler software allows compilation of submitted water audit data.

Assessment of Collected Data

The WRTAC evaluated the existing content and format of the TDEC Monthly Operating Report to determine if it duplicates any other submitted information. The MOR only includes one water quantity figure – potable water produced – and is mainly a water quality report unlike the other cited resources which are quantity-focused.

The newly-introduced AWWA Water Audit software should provide more information on water systems (particularly through the Compiler software) than has been available previously, including non-revenue water as percent by cost of operating system and unavoidable annual real losses. Some of the baseline information collected through the AWWA Water Audit may enable the USGS to modify their water system survey to focus their questions on water use by sector.

Some of the existing data is collected in hard copy and there is no compilation of the information provided to the public. Also, the group noted that the nomenclature used in many of the reports varies which can create some difficulties when trying to compare the data.

Significant Gaps in Collected Data

There were several identified gaps in statewide basic hydrologic and water system information.

There are legislated gaps due to agricultural exemptions in the Water Withdrawal Registration Act which limit the amount of available information related to irrigation. The Tennessee Department of Agriculture is evaluating how to encourage more self-reporting. County irrigation in the TVA Assessment of Water Use is estimated using USDA estimates of crop acreages and assumed water application rates.

There are approximately 120 USGS gages for surface water with information from as many as 300 different sites. Currently groundwater data is obtained from only 20 wells, the majority of which are located in west Tennessee.

USGS has the ability to produce a 7Q10 for all the stream systems in the state incorporating September median flow, use info, population projection data and ecological flow information, by county. The WRTAC discussed the need for some type of standardized statewide method for determining ecological flow through discussions between TDEC, TWRA, The Nature Conservancy, USGS, the Corps of Engineers and the environmental community.

An Aquatic Resources Alteration Permit (ARAP) is required for projects that will physically alter surface waters of the state (streams, wetlands, lakes, etc.) including water withdrawals. There is no generally available information on ARAP permits issued for self-supplied uses such as agriculture or landscape irrigation.

It can be critical to understand water use by sector (e.g., commercial, residential, industrial, etc.) when projecting future water demand. USGS attempts to gather this information when it conducts its 5-year water system survey; however, the majority of water systems do not track water use by sector. Also, TVA has found that communities with combined sanitary sewer systems can be a source of inaccurate wastewater return values and, as a result, inaccurate consumptive use estimates. The Corps has found that significant inflow and infiltration occurs in most sewer infrastructure, depending upon age and maintenance.

The Nashville District Corps of Engineers maintains an extensive network of stream and rainfall gages in the Cumberland River basin (75 rainfall gages, 45 stream gages for stage and flow, 7 real-time water quality gages, 62 water quality sampling sites). This network is designed and utilized to support the Corps mission of operating the Cumberland River system of dams. Select data from this network is available on the Corps' public website but is not downloadable and limited to observations from the previous day, 10 days, or current year to date. Historic data is archived to an internal database and is not readily available for retrieval by the public. Requests for specific data sets are accommodated on a case-by-case basis but may require submittal of Freedom of Information Act requests.

Providing this data to the public is not the primary mission of the Corps and there is no funding available to establish the necessary hardware and software, or perform the system maintenance, that would be required.

The WRTAC discussed the possibility of the USGS presenting the Nashville District Corps of Engineers' data through their website. Pursuit of this option would require the USGS confirmation of their ability to present data not directly QA/QC'd by them. They also would need to work with the Corps, and potentially other partners, to identify a funding source to accomplish the technological requirements.

Proposal for Statewide System of Basic Hydrologic and Water System Information

Goal

The goal of a statewide system is to provide centralized access to water resource information. Access will be provided to the general public; however the initial focus will be to provide resources that would be helpful for systems developing regional water resources plans. Additional water resource information could be added in the future to broaden the scope of the website.

Proposed Functionality of the System

The proposed system will be a portal providing access to independently-owned, managed and updated databases and websites. The portal will be developed and hosted by an academic or other appropriate institution. The portal will include disclaimers regarding the use of the data obtained through the site. The Florida Department of Environmental Protection Water Data Central (http://www.dep.state.fl.us/water/datacentral/data.htm) and the U.S. Corps of Engineers Water Toolbox (http://www.watertoolbox.us/intro/f?p=689:1:) will be used as models.

Proposed Databases and Websites Accessed through Portal

The initial list of proposed databases and websites to be accessed through the portal is included as Appendix A.

Recommended Next Steps

WRTAC recommends that TDEC seek proposals from academic or other appropriate institutions for the design, production and hosting of a statewide water resource information portal, including collaborative proposals from partnerships between institutions. Based on the estimated costs, TDEC may pursue partnering with other organizations to support the development of the portal and its long-term hosting.

Appendix A
Proposed Databases and Websites Accessed through Portal

The portal would be organized to mirror the sections of the *Regional Water Resources Guidelines for Tennessee*.

Define the Region Section

- Exceptional TN Waters or Outstanding Natural Resource Areas (TDEC Data viewer)
- Interactive Rare Species Database for Environmental Review (TDEC Natural Heritage program – Data viewer)
- Tennessee Watersheds (TDEC)
- TWRA Comprehensive Wildlife Conservation Strategy

Assess Existing Sources and Systems Section

- Acceptable Water Loss Limits (Tennessee Comptroller of the Treasury)
- Historical record of rainfall (NOAA National Climatic Data Center)
- US Army Corps of Engineers Hydrologic Modeling System (HEC-HMS)
- TN Planning of Regional Water Supply (TN Tech University)
- Watershed Management Optimization Support Tool (WMOST) (EPA)
- Water Data for the Nation (USGS)
- Climate Data (PRISM Climate Group)

System Efficiency Factors / Water Loss / Water Conservation Section

- Water Loss Control (AWWA)
- Water Efficiency Strategies (EPA)
- EPA WaterSense
- Water Conservation Plan Guidelines (EPA)
- Climate Resilience Evaluation and Awareness Tool (CREAT) (EPA)

Financial Strength / Affordability Section

- Full-cost pricing financial indicators (University of North Carolina, USEPA Regional Environmental Finance Center)
- The Cost of Water and Wastewater Service in the United States (National Rural Water Association)

Project Future Unmet Need Section

- Published population projections (UT Center for Business and Economic Research)
- U.S. Bureau of the Census

Potential Permitting Requirements Section

- Water Resources permitting in Tennessee (TDEC)
- US Army Corps of Engineers regulatory permits
- Tennessee Valley Authority permitting requirements

Formalizing Agreements Section

- *Crafting Inter-Local Water Agreements* (University of North Carolina EFC)
- *Guidance for Developing Community Water System Drought Management Plans* (TDEC)
- TCA Interlocal Cooperation Act, Title 12, Chapter 9, Part 1

Financing Section

- *Finding Money for Municipal Water, Wastewater and Solid Waste Projects in TN* (University of Tennessee - Municipal Technical Advisory Service)
- *How Any City Can Conduct a Utility Rate Study and Successfully Increase Rates* (University of Tennessee - Municipal Technical Advisory Service)
- *Meeting Water Utility Revenue Requirements: Financing and Ratemaking Alternatives* (National Regulatory Research Institute)
- State Revolving Fund Loan Program (TDEC)
- USDA Rural Development utilities assistance
- Community Development Block Grants (TN Department of Economic and Community Development)

External Water Data Sources

- Watertoolbox.us (Federal Support Toolbox for Integrated Water Resources Management)
- Water Atlas for the Eastern Region (State Climate Office of North Carolina and TVA)